(2) *Artificial Reproduction.*

Reproduction projects.

83. The forests being now worked systematically, the plans for reproduction of the areas felled over require to be considered in detail before they can be given effect to. In coupes which are flooded, the natural reproduction is so good that they present hardly any difficulty. Broad-casting a little seed to cover blanks which may occur here and there is all that is needed to assure their complete regeneration. In such lands, however, if it is intended to substitute a better species in place of that exploited, the cultural operations have to be carried on under a definite scheme. In the year under report, Divisional Forest Officers drew up projects not only for each coupe separately, but also for other lands which required immediate treatment, and issued clear and explicit orders to their subordinates in order that such areas may be reproduced within the shortest time possible. For reclothing high-lying lands to which surface moisture has to be brought from an adjacent canal or the river either by flow or lift, to enable the self or artificially sown seed to germinate first and the plants to live afterwards till they reach the moisture bearing strata, special arrangements have to be made. The cost of the operations which these arrangements entail is so heavy that the Department can ill afford to spend money on them, and therefore the most economical way is to seek the aid of the nearest zamindar or cultivator to carry them out, whenever it is volunteered. The Kot Sultan plantation referred to in paragraph 83 of last year's report is a case in point, where the preparing of the soil and the irrigation of the land is done by flow. But there are other tracts which can only be irrigated by raising the water by means of Persian wheels. The reproduction of the latter economically has been under my consideration for some time past, and the ways and means of doing so were matured during the year, and the scheme introduced from the 1897 inundation season is briefly as follows :—

AREAS WATERED BY LIFT.

(*a*) One-fourth of the area given out for cultivation annually to be treated as a plantation, and such cultural operations as may be necessary to be carried out by the cultivator.

(*b*) The area so treated to be watered during four successive seasons at the cultivator's expense.

(*c*) A hedge, 4 feet in height, to be constructed by the cultivator round the planted area, and to be kept in proper repair by him for four years.

(*d*) During the first year, the cultivator to pay full assessment on the area planted as well as that cultivated.

(*e*) In the second year, no concession to be claimed for watering the plantation.

(*f*) In the third and fourth years, an area equal to that planted in the first year to be allowed to be cultivated free of assessment in return for irrigating the plantation during those years.

(*g*) For failure on the part of the cultivator to fulfil conditions *a*, *b*, and *c*, as well as for neglect to protect the plantation, the cultivator to pay a penalty of Rs. 100 in the first year; in the second, the penalty to amount to double the assessment levied in the year the plantation is created; and the penalty to be three times the assessment, if he neglects to water or to look after the plantation in the third or fourth year.

84. The cultural operations of the year in the different divisions are briefly described below ;—

Cultural operations in the Sukkur Division were carried on in almost every range. The following were the chief works undertaken :—

KOT SULTAN RANGE.—To the regular plantation of 201 acres created last year with the aid of field crops in the Kot Sultan Reserve, 687 acres were added and treated on the same lines, 297 maunds of babul were sown and 2,000 tali (Dalbergia Sissoo) and 2,000 asri (Tamarix Articulata) slips were also planted in this extension. The method of sowing the seed was altered : instead of sowing it in lines, it was broad-casted at the same time as the cereals. The rigour of the frosts, however, retarded somewhat the growth of the seedlings of the year as well as those of the year before. In another Reserve, Bakapur near Jacobabad, a similar project was drawn up, but it could not be successfully carried out, as it depended on the Nurwah for the water-supply, which, being not over sufficient for the needs of the agricultural classes outside forest limits, was cut off just when the plantation required it most.

ABAD RANGE.—A regular plantation of 10 acres was created in the Abad Forest, in which 1,839 plants raised in nurseries were transplanted, 1,600 of which were doing well at the end of the year. Besides this, 496 seedlings were transplanted in a small plot in the Kadrapur Forest, but here the number of plants alive was only 156. In the former, the plants were watered by hand throughout the season, whereas in the latter they were left to nature. In old cultivation sites, the level of which had been raised by successive silt deposits, 127 maunds of babul seed were broad-casted over 448 acres, the reproduction in which is excellent and has hardly been injured by frosts. 3,240 tali slips were put down in blanks, but only 700 of them survived, and 115 asri out of 1,100.

MIRPUR RANGE.—The introduction of tali in some of the reserves was also tried. An area of 4 acres in all was successfully planted with slips and transplants, which varied in growth from 2½′ to 3′ in height at the end of the year. 48 maunds of babul seed were broad-casted in old cultivated sites in which reproduction is assured.

SADHUJA RANGE.—The results of the year's work were not so successful as in the other ranges, as only 410 out of the 6,350 tali and asri seedlings laid down survived. The cause of such a large number failing to strike is simply due to the operations having not been undertaken directly the flood water drained off the land. Blanks measuring 150 acres were sown with 148 maunds of babul seed, the reproduction in which is very satisfactory, only 20 per cent. of the seedlings having been killed outright by frost.

KASHMOR RANGE.—A tali nursery was started in the Gublo Forest, in which 300 plants are being reared for transplanting next season. Only 300 tali and asri cuttings out of the 4,500 said to have been put down in the several forests were alive on the 30th June 1897. Old fields in these recently acquired reserves were sown broad-cast with very encouraging results, an area of 334 acres being covered with a dense growth of babul.

SUKKUR RANGE.—Under a special arrangement hereafter described, a babul plantation covering 100 acres was created in the Garhi Halim Reserve. A cultivator volunteered to construct a masonry sluice at his own expense in a branch of the Sind Wah and to lay no claim to it if he were allowed to cultivate 200 acres for two years on payment of *assessment ruling for the adjacent village lands*. His offer was accepted, and by means of this sluice not only 100 acres out of his total grant were successfully sown with babul seed, but a large portion of the forest was irrigated as well.

In addition to the above operations in the Sukkur Division, the work of filling up vacancies as well as that of introducing babul in place of the existing growth of kandi and lye in exploited coupes was also undertaken in all the ranges, and about 500 maunds of seed were scattered over an area of 2,914 acres.

85. A sufficient quantity of babul seed was collected in the Naushahro Division, but all of it was not utilised in the expectation that the inundations would reach a still higher level later on and that it would be better to delay operations, but this expectation was not realised. 155 acres were treated on the Kot Sultan lines, but the soil being inferior the growth is said to be in a sorry plight. 500 maunds were broad-casted over an area of 900 acres in the exploited coupes.

86. As reproduction can be assured without, hardly, any artificial aid in most of the forests of the Hyderabad Division, only 83 maunds of babul seed were sown to fill up gaps.

87. The operations in the Jerruck Division were chiefly confined to areas felled over in the preceding cold weather, and 535 maunds of babul seed were used for this purpose as well as for reclothing blanks. One coupe was artificially reproduced with the aid of a cereal crop.

(3) *Early thinnings.*

88. No such operations were carried out in this Circle.